63. Based on their analysis, SIA calculated that fixed stations operating with 25 watts EIRP must be located at least 313 km away from an FSS earth station to ensure adequate protection.[126] We disagree with SIA's conclusions and instead believe that a separation distance of 150 km will provide the necessary protection for the worst case earth station configuration (*i.e.*, earth station pointing to the eastern and western limits of the geostationary arc at an elevation angle of 5°).[127] In addition, we believe that in many cases separation distances of less than 150 km can readily be achieved and still protect the FSS earth station. In reaching this conclusion, we observe that SIA, based on recommendation ITU-R S.1432,[128] assumed a criterion of ΔT/T equal to 0.5% to protect the earth stations.[129] To derive this conservative protection criterion, SIA observed that the ITU-R Recommendation specifies that of the total signal level present at an earth station, 1% of that be allocated as emanating from unlicensed devices. Then to account for transmissions from multiple devices, SIA proposed that this be further reduced by half to 0.5%. We find the protection criterion proposed by SIA to be overly conservative and unsupported by either measurement or operational experience. Further, the Commission has been consistent in its position that the specifications found in ITU-R S.1432 are design criteria for FSS earth stations, not interference protection criteria. Thus, as in the past, we categorically reject the use of these design guidelines as suitable interference criteria. In addition, we note that had SIA considered a licensed scheme for this band (and consequently, treated the interference as coming from a co-primary allocated services), the design guidelines of ITU-R S.1432 would allocate 6% as the appropriate potential signal level at the earth station antenna. Such a change to the "interference criterion" used by SIA would greatly reduce the required protection distances computed in their analysis. Therefore, we are not persuaded by SIA's arguments.

64. Using similar techniques to SIA,[130] we conclude that a protection distance of 150 km is more than adequate to protect FSS earth stations. First, it is important to observe that protection of an earth station, which has the ability under its license and the rules to operate across the full geostationary satellite arc, must be based on worst case operating conditions of a 5° elevation angle. In addition, we assumed use of the antenna radiation pattern specified in our rules.[131] However, rather than specifying a specific protection level (ΔT/T) and multipath propagation model, our analysis considered a range of parameter values. Thus we avoided selecting a specific value for the protection criterion for the earth

[126] This calculation is based on a multipath propagation model of 0.1%; meaning SIA assumed that the 0.1% was the percentage of time that the noise interference allowance (*i.e.*, ΔT/T; *see* note 101, *infra.*) could be exceeded. This model is based on standard calculations for coordinating fixed stations and earth stations specified in ITU Radio Regulations, Appendix 7. SIA also calculated separation distances of 370 km for a multipath propagation model of 0.01% and of 220 km for a model of 1%.

[127] Each FSS earth station is licensed to operate with specific satellite space stations. However, the rules allow, as a minor license modification, licensees to add additional space station locations. *See* 47 C.F.R. § 25.118. Thus, regardless of the space stations with which a licensee is authorized to communicate, we must assume that it can communicate with any space station across the visible geostationary arc, such that the antenna elevation angle is 5° or greater. *See* 47 C.F.R. § 25.205 which specifies that earth station antennas will not normally be authorized for transmission at angles less than 5°. Thus, the full viewable geostationary arc is composed of all the geostationary satellites visible to an earth station operating at 5° elevation angle and above

[128] Recommendation ITU-R S.1432 -- Apportionment of the allowable error performance degradations to Fixed-Satellite Service (FSS) hypothetical reference digital paths arising from time invariant interference for systems operating below 15 GHz.

[129] ΔT/T is an interference threshold, which is a measure of the amount of interference that can be tolerated by an earth station. Specifically, ΔT/T is a measure of the increase in system noise temperature of the earth station and is related to the interference-to-noise-ratio, I/N by the following formula: I/N in dB = 10*log (ΔT/T)

[130] *See* SIA Comments at Exhibit 1, 6-7.

[131] *See* 47 C.F.R. § 25.209.

stations in our analyses by assuring that the protection distance of 150 km is consistent with conservative assumptions and tradeoffs for the elements of our link budget. Additionally, in keeping with our conservative approach, we point out that the power limit we adopt herein is on the order of 18 dB *lower* than that proposed for licensed fixed point-to-point facilities.[132] Further, we note that by adopting out of band emission limits for the licensed fixed devices we further safeguard the protected earth stations, because these earth stations operate not only in the 3650-3700 MHz band, but also in the adjacent bands to which the out of band emission limits apply. Thus, the earth stations will directly benefit from any reduction in emissions necessary to satisfy the out of band emission limits. And finally, it is important to consider that we are adopting rules that require operators to obtain a license and register their location so that earth station operators will readily have the necessary contact information to locate potential sources should they experience interference. To underscore the conservative nature of this approach, we note that we are adopting a protection zone that far exceeds what is required, especially in the back and an area in the center of the viewable geostationary arc of the FSS antenna.[133] We are confident that the values adopted here will provide more than adequate and conservative protection to the grandfathered earth stations.

65. To further assure that FSS earth stations are adequately protected, we will impose the protection distance as a circular zone around the earth station. This differs from our proposal of using a keyhole-like pattern based on the earth station pointing towards a specific satellite. We make this decision because, in practice, each earth station can look at multiple satellites across the geostationary arc. Thus, a circular protection zone is more appropriate for ensuring interference protection in all cases. In addition, we point out that using a circular zone has the benefit of simplicity for all parties as it is easy to determine exactly which areas are excluded from terrestrial station operation.

66. Finally, we note that a more accurate determination of the requisite separation distances can be derived if the particular operating parameters of both the fixed terrestrial transmitter and protected FSS earth stations are taken into account. However, requiring operators to independently make detailed transmission path and link budget calculations could be unduly burdensome. We do, however, recognize that such operation within the conservative portion of the protection zone is possible. We thus will allow such operation so long as the FS station and the FSS station licensees mutually agree on appropriate operating parameters. An FS entity that requests to operate within the protection zone will be required to negotiate with each protected earth station that is potentially affected by the proposed fixed or mobile operation. Further, the FSS station licensee must not refuse to negotiate with the fixed licensee, and both parties should negotiate in good faith. The results of these negotiations must be documented and kept with the station's records in the event that this information is needed by the Commission. To illustrate a possible technique for coordinating a fixed station at distances closer than 150 km, we observe that in most cases the earth station operates at elevation angles well above 5°.[134] This antenna discrimination property can be used to calculate separation distances less than 150 km in many cases while still protecting the earth station from harmful interference. Methodology to make such calculations is provided as an example in Appendix D.

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[132] *See* NPRM at para. 47. We proposed that fixed systems would be limited to a maximum EIRP of 1640 Watts (32.15 dBW), which, if measured over the same bandwidth, is 18 dB greater than the 25 watts (14 dB) being adopted here.

[133] An FSS earth station antenna pointed towards the center of its viewable geostationary arc operates at elevation angles well above 5° which provides protection by isolating it from terrestrial stations. Similarly, an antenna will have very little gain, if any, directly behind it, thus isolating it from energy emitted from a terrestrial station.

[134] As an earth station points at various satellites on the geostationary arc, its elevation angle increases as it approaches a pointing azimuth of 180° which corresponds to pointing at the center of the arc.

67. *Equipment Authorization Requirements.* As discussed above in the licensing sections, we adopt rules to license terrestrial operations in the 3650 MHz band under Part 90 of our rules. We observe that there is a general requirement for all equipment to obtain certification under that rule part.[135] This requirement recognizes that there is a certain "core group" of equipment that requires a higher level of oversight than manufacturer's self-approval (Declaration of Conformance or Verification), due to a high risk of non-compliance, the potential to create significant interference to safety and other communication services, and the need to ensure compliance with the requirements to protect against radio frequency exposure.[136] We find that because of the risk of interference to FSS earth stations, equipment designed for operation in the 3650 MHz band falls into this "core group" of equipment. Thus, as with other Part 90 equipment, we will require manufacturers to obtain certification for their equipment. We note that applications for equipment authorization must contain specific information regarding the methods employed to meet our rules. Specifically, we've already noted that the certification application for systems using advanced antenna technology must provide the algorithm used to reduce the EIRP to the maximum allowed in the event of overlapping beams. In addition, the application must contain information discussing how the equipment meets the requirement to employ a contention based protocol for gaining access to the spectrum and for mobile transmitters, including a description of how the requirement to positively receive and decode an enabling signal is incorporated.

68. One final point to consider is that the rules currently require certification to be approved by the Commission or a designated Telecommunication Certification Body (TCB) before they may be marketed. In General Docket 98-68, we established the requirements for TCBs that are allowed to approve equipment in the same manner as the Commission.[137] In that proceeding, we stated that while we intended to use TCBs to certify a broad range of equipment, we found that certain functions should continue to be performed by the Commission. The functions included certifying new or unique equipment for which the rules or requirements do not exist or for which the application of the rules is not clear.[138] Because we have not previously specified that certification would be based on specification of a contention based protocol, nor on the ability of a mobile station to transmit only after receiving an enabling signal from a base station, we believe that many questions about the application of the rules may arise. Thus, we believe that TCBs should not be permitted to certify or approve permissive changes for equipment operating under the rules adopted herein until we gain sufficient experience with this band.[139] Once the Commission gains sufficient experience with equipment in this band, it will determine whether TCBs should be permitted to certify them. Accordingly, until the Chief of the Office of Engineering and Technology acting under the existing delegated authority issues an announcement by public notice, TCBs will not be permitted to certify equipment in the 3650-3700 MHz band.[140]

69. *RF Safety.* As noted above, we will require manufacturers to obtain certification for their equipment, among other reasons, to address the need for compliance with the requirements to protect

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[135] *See* 47 C.F.R. § 90.203.

[136] *See Report and Order* in ET Docket No. 97-94, 13 FCC Rcd 11415 (1998).

[137] *See In the Matter of 1998 Biennial Regulatory Review – Amendment of Parts 2, 25 and 68 of the Commission's Rules to Further Streamline the Equipment Authorization Process for Radio Frequency Equipment, Modify the Equipment Authorization Process for Telephone Terminal Equipment, Implement Mutual Recognition Agreements and Begin Implementation of the Global Mobile Personal Communications by Satellite (GMPCS) Arrangements*, Report and Order, FCC 98-338, 13 FCC Rcd 24687 (1999).

[138] *Id.* at ¶ 33.

[139] We currently do not allow TCBs to certify equipment requiring measurements of the specific absorption rate (SAR) of RF radiation by the body. No change in that policy is proposed.

[140] *See* 47 C.F.R. § 0.241(g).

against radio frequency (RF) exposure. In addition, licensees are responsible for ensuring that transmitting equipment, as actually installed, continues to meet RF exposure guidelines. For example, fixed transmitters operating at the peak EIRP output power of 25 Watts/25 MHz authorized in this Order would not generally be required to undergo routine RF safety evaluation as a part of the equipment certification process because installation constraints typically result in sufficient separation distances such that human exposure limits would not be exceeded.[141] Nevertheless, we recognize that such transmitters, particularly those that might be licensed by individuals or other small entities, could have a greater chance of being installed in a diverse range of atypical environments; possibly, for example, even inside a residential home. In such instances, an improper installation could result in circumstances where RF safety standards might be exceeded due to a reduced separation distance. Consequently, we will require, as part of the certification process, that equipment manufacturers include sufficiently detailed installation instructions and guidelines to ensure that licensees locate such transmitters in a manner that will maintain appropriate human exposure separations at all times.

70. By comparison, non-fixed transmitters generally require additional evaluation as a part of the manufacturer's equipment certification process.[142] Based upon the peak EIRP operating limit of 1 Watt specified here, we will require routine evaluation for these devices to demonstrate RF exposure compliance. In any event, manufacturers are responsible for ensuring that any equipment they design, manufacture, and sell meets the corresponding RF safety limits.[143] Licensees of non-fixed transmitters may generally rely upon the manufacturers' equipment certification that RF exposure guidelines for that equipment have been met.

71. *Federal Government Facilities.* In the *NPRM*, we sought comment on whether the methods described in the *NPRM* would provide an effective means of protecting the three Federal Government radiolocation stations that operate in the 3650-3700 MHz band on a primary basis. These stations, located at St. Inigoes, MD, Pascagoula, MS, and Pensacola, FL, were grandfathered as a condition of the transfer of the 3650 MHz band to a mixed-use status.[144] The current rules require that FS and FSS stations located within 80 kilometers of each site coordinate with the Federal Government.[145] As noted, this protection criterion for Federal stations has been in existence for fixed stations since 1999 and we did not propose to alter it. Thus, we will continue to require coordination with NTIA through the Frequency Assignment Subcommittee of the Interdepartmental Radio Advisory Committee for any station that requests registration of a site closer than 80 km from the three specified radiolocation sites. We further note that our ULS system has the capability of screening for any terrestrial applications that might propose site coordinates located within the 80 kilometer coordination zone and, within approximately 24 hours, flag that application for any necessary coordination.

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[141] Fixed transmitters are exempted from routine evaluation to demonstrate RF exposure compliance, except that the requirements of §1.1307(b)(3) are applicable when a fixed transmitter is co-located with other transmitters on a site.

[142] In particular, for RF safety purposes, non-fixed transmitters (such as those discussed under the general umbrella term 'mobile' elsewhere in this Order) fall into two categories - - - 1) 'portable', and 2) 'mobile.' Portable transmitters are classified as those that operate within 20 cm of human contact, while mobile transmitters are those that operate at distances greater than, or equal to, 20 cm from human contact. Furthermore, portable devices are typically required to comply with Specific Absorption Rate (SAR) limits, while mobile devices are required to comply with power density limits, as defined in §§2.1093 and 2.1091, respectively, of the rules.

[143] *See* 47 C.F.R. § 1.1310 for details concerning the commission's rules related to human exposure.

[144] *See* letter dated November 2, 1999 from William T. Hatch, Acting Associate Administrator, NTIA to Dale Hatfield, Chief, OET ("*November NTIA letter*"). The coordinates of each site are: St. Inigoes, MD (38° 10' N., 76°, 23' W.); Pascagoula, MS (30° 22' N., 88°, 29' W.); and Pensacola, FL (30° 21' 28" N., 87°, 16' 26" W.).

[145] *See* 47 C.F.R. § 2.106, note US348.

72. Furthermore, we reiterate to potential users of the 3650-3700 MHz band that the adjacent 3600-3650 MHz band is used by high power federal government radar systems and they are not limited to the three protected sites. Consequently, terrestrial transmitter/receiver manufacturers will likely find the need to incorporate design measures to protect their equipment from possible overload by these adjacent band radar signals. The Commission strongly recommends that parties installing equipment in this band should determine if there are any nearby Federal Government radar systems that could affect their operations. Information regarding the locations and operational characteristics of the radar systems operating adjacent to this band are provided in NTIA TR-99-361.

73. *Operation in Proximity to U.S. Borders.* To provide sufficient protection to Canadian and Mexican stations operating in the 3650-3700 MHz band that are located near the U.S. borders, we proposed in the *NPRM* to require that fixed devices be located at least 8 kilometers from the U.S./Canada or U.S./Mexico border if the antenna of the device looks within the 160° sector away from the border and be located at least 56 kilometers from each border if the device looks within the 200° sector towards the border. This proposal is consistent with the treatment of licensed fixed stations in bands above 470 MHz along the U.S./Canada border.[146] We conclude that these same considerations apply to the type of licensed operation that we permit in this Order. Accordingly, we adopt the requirements for operation near the borders as proposed. We point out, however, that even under these guidelines, operators might need to further reduce their power to protect FSS earth stations in Canada or Mexico. We further note that, under our current agreement with Canada, operations within the distances specified above may be permitted if we are able to coordinate such use with Canada. We have no agreement with Mexico to permit such coordinated use at this time. In the future, we may negotiate more specific agreements with Mexico and Canada to govern operations near our borders in the 3650-3700 MHz band. Licensees in this band would be required to comply with the provisions of such agreements.

74. *Adjacent Band Emissions.* In the *NPRM*, we sought updated comment on what interference criteria might be used to protect adjacent band services from licensed systems operating in the 3650 MHz band. For example, we asked if we should require that licensed non-fixed devices comply with the field strength limit described in the *NPRM* for unlicensed devices; or whether we should require that licensed fixed stations comply with a particular field strength limit or satisfy the adjacent band protection criteria proposed in the *3650 MHz Service Rules Second Notice.*[147] In the *3650 MHz Service Rules Second Notice*, we proposed that, in order to protect FSS operations in the 3700-4200 MHz band from interference, terrestrial stations operating in the 3650-3700 MHz band would have to comply with the Part 101 emission limits already in place to protect such FSS systems from licensed fixed stations operating in the 3700-4200 MHz band.[148] Therein, we discussed a proposal made earlier in the ET. Docket 98-237 proceeding concerning whether the out of band emission limit defined by 43 + 10 log(P) dB minimum attenuation that applies to broadband PCS should be applied to FS operations in the 3650-3700 MHz

[146] *See* U.S. - Canada treaty, "Revised Technical Annex Telecommunication: Coordination and Use of Radio Frequencies Above 30 Megacycles per Second," Signed at Ottawa June 16 and 24, 1965; entered into force June 24, 1965.

[147] *See Unlicensed Operation NPRM* at ¶ 84.

[148] *See 3650 MHz Service Rules Second Notice*, 15 FCC Rcd at 20533 ¶ 115. *See also* 47 C.F.R. §101.111.

band.[149] Comments to that earlier proposal were divided.[150] In that context, the Commission proposed in the *3650 MHz Service Rules Notice* to require that terrestrial service equipment operating in the 3650-3700 MHz band comply with the emission limits already in place for FS operation in the adjacent 3700-4200 MHz band.[151] Commenters to that proposal were similarly split on what criterion to apply.

75. We adopt rules here to require that new terrestrial operations in the 3650 MHz band limit emissions into the adjacent 3600-3650 MHz and 3700–4400 MHz bands by a minimum attenuation of 43 + 10 log(P) below the transmit power. That is, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P). We note that this requirement is consistent with the out of band emission limit specified in several of the Commission rule parts (reference) for wireless devices including higher power devices. Furthermore, the limit specified in this section is a generic limit that has been applied successfully for many of our wireless services. Finally, we note that this limit is very conservative, especially for coded digital signals which generally decay more rapidly and produce lower levels of out of band emission than analog signals. On balance, therefore, we believe that this criterion should provide appropriate protection from out of band emission.

76. *Space station power flux density.* In the *3650 MHz Service Rules Notice* we sought comment on whether we should adopt a rule for the power flux density (pfd) that a space station operating in the 3650-3700 MHz band may produce consistent with the limit for space stations in the adjacent 3700-4200 MHz band. The limit for the 3700-4200 MHz band, which is contained in Section 25.208(a) of the Commission's rules,[152] is identical to the limit in the ITU Radio Regulations, which applies throughout the 3400-4200 MHz band. One commenter supports applying the same pfd limit in the 3650-3700 MHz band as we do to the upper adjacent band.[153] In order to conform our rules in this regard to the ITU Radio Regulations, we will apply the same pfd limit in the 3650-3700 MHz band as we do in the 3700-4200 MHz band.

IV. MEMORANDUM OPINION AND ORDER

77. In this MO&O we address several petitions for reconsideration and an emergency motion for stay that were filed in response to the *3650 MHz Allocation Order* in ET Docket No. 98-237.

A. Statutory Considerations

78. The Coalition, Lockheed Martin and Immarsat argue, among other things, that the Commission improperly based its allocation decisions in the *3650 MHz Allocation Order* on expectation

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[149] *See 3650 MHz Service Rules Notice* at ¶ 110, citing *Amendment of the Commission's Rules with Regard to the 3650-3700 MHz Government Transfer Band*, ET Docket No. 98-237, Notice of Proposed Rule Making and Order, 14 FCC Rcd at 1295, at 1303-04 (¶ 11) (1998).

[150] For example, FSS operators requested that a stricter limit of 60 + 10log(p) dB be placed on FS operations in the 3650-3700 MHz band. In addition, Nortel recommended that we require that at the edge of the 50 megahertz block in any 30 kHz bandwidth, unwanted emission spectral power density be attenuated by at least (i) 10 dB at the band edge; (ii) 25 dB at 200-400 kHz from the band edge; (iii) 25 dB at 400 kHz to 50 dB at 3.0 MHz offset, linearly interpolated; (iv) 50 dB beyond 3 MHz from the band edge or in any one MHz band which is removed more than 250% of the necessary bandwidth at least 43 + 10 log (Pmean) dB or 80 dB whichever is less stringent, where Pmean is the mean output power of the transmitter in watts. *See 3650 MHz Service Rules Notice* at ¶ 110.

[151] *Id.* at ¶111.

[152] *See* 47 C.F.R.§ 25.208(a).

[153] Astrolink comments at 10.

of revenue. It is further argued that the decision to substitute the 50 megahertz of spectrum in the 3650-3700 MHz band for the 15 megahertz to fulfill the Commission's statutory obligations (identified by certain statutory provisions for other frequency bands) was flawed.

79. Consistent with our conclusion in the *Unlicensed Operation NPRM*, we find no statutory obstacle to our decision to affirm our previous allocation decision.[154] In the *Unlicensed Operation NPRM*, we concluded that we do not have any remaining statutory obligations under Section 3002 of the BBA.[155] Moreover, in consideration of our decision discussed more fully above to adopt a licensing approach that does not result in the acceptance of mutually-exclusive applications, the arguments presented by satellite interests to the effect that the Commission inappropriately determined that the 3650 MHz band could satisfy the requirements of Section 3002 of the BBA are moot.[156]

B. Allocation issues

80. Petitioners generally challenge the rules adopted in the *3650 MHz Allocation Order* that created a new, primary FS/MS allocation and made future, non-grandfathered FSS earth stations secondary. Among others, the Extended C-Band Ad Hoc Coalition (C-Band Coalition) argues that the record demonstrates a demand for satellite services but little support for proposed FS in the band. Lockheed Martin, Inmarsat and the C-Band Coalition further generally argue that the Commission did not consider the significant potential for sharing between FS/FSS even though certain commenters provided evidence to support sharing, and that the Commission must address technical sharing issues before deciding whether to eliminate future primary FSS operations. For example, Inmarsat argues that FSS earth stations don't need exclusion zones defined by coordination contours; and that mitigation factors can be used for sharing. The C-Band Coalition further argues that most potential FS providers did not support the FS allocation and that, consequently, the decision in 3650 MHz Allocation Order is not supported by substantial evidence and is not rational.

81. In the *NPRM*, we asked for comments to refresh the record on the full range of allocation, technical, service and licensing issues raised in this proceeding - including the possibility of revisiting the FSS allocation status in the 3650 MHz band. Thus, we have considered anew the potential benefit of different sharing mechanisms in light of this renewed and expanded record. With more specific relation to these petitions for reconsideration, our decision here affirms the FSS allocation changes made in the *3650 MHz Allocation Order*. In essence, we have decided that it is desirable to foster new terrestrial services under the FS/MS allocations while protecting a relatively small and static number of grandfathered FSS earth stations in the band. We accomplish this goal by providing a mechanism (under a streamlined licensing approach) for preventing and addressing any interference concerns of FSS earth

[154] *Unlicensed Operation NPRM*, 19 FCC Rcd 7545 (¶¶ 19-21).

[155] We also found that, to the extent that it might be argued that our obligations under Section 3002 remain unfulfilled, several alternative options exist with which to fulfill them. *Id.*

[156] *See, e.g.*, Extended C-Band Coalition Petition at 15-16 (suggesting that Commission inappropriately based allocation decision on expectation of auction revenues); Lockheed Martin Petition at 3, 7 (substitution of 3650 MHz band spectrum to fulfill statutory obligations was arbitrary and unwarranted); Inmarsat Petition at 5-6 (Commission erred in concluding that 3650 MHz band was an "equivalent and viable substitute" for 15 megahertz of spectrum in the 1990-2110 MHz range). We note that in accordance with Section 3002(c)(4) of the BBA, it was NTIA that identified alternative frequencies that included, among others, the 3650 MHz band as possible substitutes for the required assignment of 15 MHz. *See* Identification of Alternate Bands in Response to the Balanced Budget Act of 1997, NTIA 98-39 (Nov. 1998),at 25-29. Moreover, a statutory condition of the recommendation for such substitution required that the alternative spectrum "better serve the public interest, convenience, and necessity" and that "the alternative could reasonably be expected to produce comparable receipts." *See* The Balanced Budget Act of 1997, Section 3002(c)(4), Pub. L. 105-33, 111 Stat. 251-258 (1997) ("BBA").

stations that might arise from sharing the band with terrestrial operations. We thus find that our decision strikes a balance among a number of competing factors in a manner that we believe will best serve the public interest and foster the expeditious introduction of new terrestrial services in the 3650 MHz band.

82. In light of our full review of the refreshed record in this proceeding, and in light of the decisions made in the companion Order, we thus deny the aspects of the petitions that challenge and seek to reverse the allocation decisions made in the *3650 MHz Allocation Order*.

C. TT&C Issues

83. In the *3650 MHz Allocation Order*, we denied a petition for rulemaking insofar as it requested the designation of ten megahertz of spectrum within the 3650-3700 MHz band exclusively for Tracking, Telemetry and Command (TT&C).[157] We noted that Part 2 of our rules allow the 3650-3700 MHz band to be used for TT&C under the FSS allocation provided they support an FSS system.[158] Although we dismissed without prejudice the petition insofar as it requested that FSS licensees with systems operating outside the 3650-3700 MHz band (e.g., Ka and V band satellite systems) be allowed to use the band for TT&C, we raised this issue in the 3650 MHz Service Rules Notice. Furthermore, the *3650 MHz Allocation Order* determined that existing TT&C earth stations in the 3650-3700 MHz band would be treated the same as other earth stations in the band (i.e., existing earth stations and applications submitted prior to Dec. 1, 2000 would have primary status) but would only be protected for the frequencies already authorized for TT&C use. We also stated that any other TT&C site that received grandfathering protection would also be protected only for the specific frequencies for which the site was authorized to operate on pursuant to its license.

84. The Extended C-Band Ad Hoc Coalition (Coalition) argues that the November 30, 2000 deadline for filing co-primary earth stations applications is arbitrary and unsupported by the record. The Coalition argues that new satellites, particularly in the Ka and V bands, need access to the 3650 MHz band for TT&C purposes because propagation anomalies (such as rain fade) in higher frequency bands makes them unsuitable for such use. Among other concerns, the Coalition further argues that equipment for TT&C does not exist for higher bands, and that allowing the TT&C operations in the 3650 MHz band would increase system reliability and reduce operational costs. They further argue that the FCC filed advance publication and coordination information with the ITU to cover use of the 3650 MHz band for TT&C links by future satellites in the Ka and V bands. The Coalition also argues that TT&C downlinks require only a small number of earth stations using a limited amount of spectrum. In light of these assertions, the Coalition seeks reconsideration to allow the operation of new TT&C earth stations on a primary basis in the 3650 MHz band, including out-of-band Ka and V band systems, within the protected 10 mile zone around incumbent grandfathered earth stations that was established by the *FSS Freeze MO&O*. Other parties, such as GE Americom and Inmarsat, generally support the Coalition's arguments for modifying the filing deadline for co-primary TT&C earth stations, including use of the 3650 MHz band for TT&C by out-of-band Ka and V band satellite systems.

85. Echostar requests that the FCC clarify its intent to exempt from the FSS application "freeze" all future requests by earth stations for TT&C operations that serve satellites already authorized in the 3650 MHz band, including new uplink sites such as EchoStar's Gilbert, AZ site. In that regard, Echostar states that it desires to have the flexibility of using various earth stations for TT&C if, for example, one of its satellites were to be moved to a different orbit location. If this was not the Commission's intent, Echostar requests that we reconsider the decision and provide for this flexibility of TT&C operations that serve already authorized satellite systems.

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[157] *See 3650 MHz Allocation Order* at ¶ 33.

[158] *Id.*

86. Along similar lines, Lockheed Martin requests that we remove the restriction on grandfathered TT&C sites to frequencies for which the ES is already licensed, and allow new frequencies for TT&C subject to coordination. In support, Lockheed argues that these restrictions curtail the range of choices for TT&C sites, and that new satellite design or services could require change in TT&C frequency or power levels. Lockheed further argues that secondary status for TT&C is problematic and, since satellite operators would not invest in a secondary TT&C operation at 3650 MHz, the Commission's decision does not help alleviate congestion in the adjacent 3700-4200 MHz band.

87. We deny the petitions the reconsideration insofar as they request that we allow in the 3650 MHz band new TT&C earth stations on a primary basis for out-of-band FSS systems. We conclude, as we stated in the *3650 MHz Service Rules Notice*, that the basic purpose of our Part 25 in-band rules for TT&C is valid. Rule section 25.202(g) effectively limits FSS operators to operating TT&C links in the same frequency bands as their FSS operations. Thus, a GSO/FSS operator will generally coordinate its TT&C operations with the same set of satellites, at adjacent orbital locations, with which it coordinates its FSS operations. This simplifies the coordination process for FSS systems and also provides an incentive for an operator to maximize the efficiency of a system's TT&C operations while minimizing the constraints placed on other satellite operations. Our decision also is based on a recognition that certain events have occurred since these petitions were filed that mitigate the need to provide the requested relief. We note, in particular, that we have since authorized satellite systems in the Ka band with TT&C links to be located within band. As a result, TT&C facilities are now available for Ka band systems. As for pending V band system applications, we believe that it is best to address the TT&C needs of particular systems in the context of acting on specific applications for waiver rather than modify our rule based on generalized arguments that some assigned frequency bands of satellite systems are so congested, unreliable, or lacking in manufactured equipment as to render in-band TT&C operations unfeasible.

88. With regard to the filing deadline for co-primary TT&C earth station applications, the secondary status of non-grandfathered TT&C sites, and the restriction on grandfathered TT&C sites to frequencies for which the earth station is already licensed, we believe that those aspects of the Commission's decision in the *3650 MHz Allocation Order* are necessary measures that help ensure the terrestrial operations under the primary FS/MS allocations are not unduly hampered. We thus decline to modify these decisions. Furthermore, we clarify that the decision in the *3650 MHz Allocation Order* was not intended to exempt from the FSS application "freeze," as EchoStar requests, any future requests for earth stations for TT&C operations that serve satellites already authorized in the 3650 MHz band, including new uplink sites. Nonetheless, we recognize that individual cases of particular need, particularly for systems already authorized for the 3650 MHz band, can be better addressed through a waiver process that would evaluate each request on its merit.

D. Emergency Motion for Stay

89. In October, 2000, the Commission determined that it was necessary to establish a limit on the acceptance of applications and on the construction of FSS facilities that would be considered primary under the established grandfathering provisions.[159] Accordingly, in the *3650 MHz Allocation Order*, the Commission decided that applications for FSS earth stations in the 3650-3700 MHz band located within 10 miles of the authorized coordinates of an existing grandfathered earth station must be filed prior to December 1, 2000, in order to still be considered co-primary.[160]

90. In response, the Coalition filed an "Emergency Motion for Stay Pending Reconsideration"

[159] *See 3650 MHz Allocation Order*, at ¶ 29.

[160] *Id.*. The Commission also stated that it would continue to accept applications subsequent to the end of the filing window for additional FSS earth stations, but that such additional earth stations would be considered secondary.

moving that the Commission issue a stay of the November 30, 2000, deadline by which satellite users were required to file new or modified applications for earth stations to operate space-to-Earth links on a co-primary basis in the 3650 MHz band.[161]

91. We deny the motion for stay. When the Commission established the November 30, 2000, filing deadline, it did so because it found that additional new FSS facilities permitted by the *Freeze MO&O* could affect the use of the 3650-3700 MHz band by the terrestrial services.[162] By deciding in this Order to maintain the FSS allocation changes made in the *3650 MHz Allocation Order*, we reaffirm our conclusion that allowing additional primary FSS earth stations in the 3650 MHz band could negatively affect the prospects for viable FS/MS terrestrial operations. In light of the foregoing, we conclude that granting the stay (with the possible consequence of establishing new FSS filing window, and thereby increasing the number of primary FSS earth stations in the band) would be directly counter to our fundamental judgments concerning future use of the 3650 MHz band and would not serve the public interest.

V. CONCLUSION

92. In this Order, we adopt a streamlined licensing approach to authorizing terrestrial operations in the 3650 MHz band that combines beneficial aspects of both an unlicensed and licensed regimes. We continue to believe that the 3650 MHz band is well suited to respond to the needs expressed by the growing number of entrepreneurial wireless Internet service providers (WISPs) for additional spectrum to provide broadband backhaul and connectivity, particularly to those customers located in rural areas of America's heartland that are often beyond the reach of traditional providers. Permitting terrestrial operation in the 3650 MHz band under the streamlined licensing approach adopted herein should facilitate the rapid deployment of advanced telecommunications services and technologies to all Americans, thus promoting the objectives of Section 706 of the Telecommunications Act of 1996.

VI. PROCEDURAL MATTERS

A. Final Regulatory Flexibility Analysis

93. A Final Regulatory Flexibility Analysis has been prepared for this Report and Order and is included in Appendix B.

B. Paperwork Reduction Analysis

94. This Report and Order contains new information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. It will be submitted to the Office of Management and Budget (OMB) for review under Section 3507(d) of the PRA. OMB, the general public, and other Federal agencies are invited to comment on the new information collection requirements contained in this proceeding. In addition, we note that the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. 3506(c)(4), requires the Commission to consider ways to "further reduce the information collection burden for small business concerns with fewer than 25 employees."

95. In this Report and Order, we require entities, including business concerns with fewer than 25 employees, who are interested in using the 3650 MHz band for wireless services to acquire a wireless license and register their fixed and base stations before beginning to offer services in the band. The

[161] *See* Emergency Motion for Stay Pending Reconsideration, filed by Extended C-Band Coalition, November 29, 2000.

[162] *See 3650 MHz Allocation Order*, at ¶ 29

impact of this requirement on small businesses and those with few than 25 employees should be minimal. The licensing and registration process is simple and streamlined and will be done electronically utilizing the Commission's Universal Licensing System. As a result, businesses with fewer than 25 employees should be able to acquire a wireless license for this band without difficulty and with a minimum of burden. We believe that the licensing scheme we have adopted for this spectrum is ideally tailed to the needs of businesses with fewer than 25 employees and other entities with limited resources.

C. Congressional Review Act

96. The Commission will send a copy of this Report and Order in a report to be sent to Congress and the Government Accountability Office (GAO) pursuant to the Congressional Review Act, see 5 U.S.C. 801(a)(1)(A).

D. Contact Persons

97. For further information concerning this rule making proceeding contact: Gary Thayer at (202) 418-2290, Gary.Thayer@fcc.gov; Office of Engineering and Technology; Eli Johnson at (202) 418-1395, Eli.Johnson@fcc.gov; Wireless Telecommunications Bureau.

VII. ORDERING CLAUSES

98. Accordingly, IT IS ORDERED that, pursuant to the authority contained in Sections 4(i), 302, 303(e), 303(f), and 307 of the Communications Act of 1934, as amended, 47 USC Sections 154(i), 302, 303(c), 303(f), and 307 this Report and Order IS HEREBY ADOPTED.

99. IT IS FURTHER ORDERED that Parts 1, 2, 15, and 90 of the Commission's rules ARE AMENDED as specified in Appendix A, and such rule amendments shall be effective 30 days after publication of the text thereof in the Federal Register. This Report and Order contains information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13, that are not effective until approved by the Office of Management and Budget. The Federal Communications Commission will publish a document in the Federal Register following approval of the information collection by the Office of Management and Budget ("OMB") announcing the effective date of those rules.

100. IT IS FURTHER ORDERED that, pursuant to Sections 4(i), 302, 303(e), 303(f), 303(r) and 307 of the Communications Act of 1934, as amended, 47 USC Sections 154(i), 302, 303(e), 303(f), 303(r) and 307, the 3650 MHz Proceeding in ET Docket No. 98-237 IS TERMINATED.

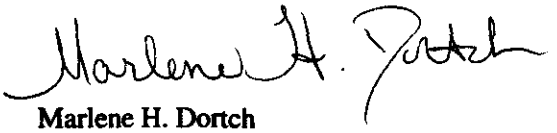
101. IT IS FURTHER ORDERED that, pursuant to Sections 4(i), 302, 303(e) 303(f), 303(g), 303(r) and 405 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 302, 303(e), 303(f), 303(g) and 405, that the petitions for reconsideration of the *3650 MHz Allocation Order* ARE DENIED.

102. IT IS FURTHER ORDERED that, pursuant to Sections 4(i), 302, 303(e) 303(f), 303(g), 303(r) and 405 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 302, 303(e), 303(f), 303(g) and 405, that the *Emergency Motion for Stay* of the *3650 MHz Allocation Order* IS DENIED.

103. IT IS FURTHER ORDERED that, pursuant to 47 U.S.C. § 155(c) and 47 C.F.R. §§ 0.131(c) and 0.331, the Wireless Telecommunications Bureau IS GRANTED DELEGATED AUTHORITY to adopt requirements regarding the reporting of registration and licensing information, pertaining to the 3650 MHz Wireless Broadband Services, in the Universal Licensing System database.

104. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this Report and Order and Memorandum Opinion and Order, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION



Marlene H. Dortch
Secretary

APPENDIX A: Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 C.F.R. parts 2, 25, and 90 as follows:

PART 1 – PRACTICE AND PROCEDURE

1. The authority citation for Part 1 continues to read as follows:

AUTHORITY: 47 U.S.C. 151, 154(i), 154(j), 155, 225, 303(r), 309, and 325(e)

3. Section 1.1307 is amended by revising paragraph (b) (2) to read as follows:

§ 1.1307 Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.

* * * * *

(2) (2) Mobile and portable transmitting devices that operate in the Cellular Radiotelephone Service, the Personal Communications Services (PCS), the Satellite Communications Services, the General Wireless Communications Service, the Wireless Communications Service, the Maritime Services (ship earth stations only), the Specialized Mobile Radio Service, and the 3650MHz Wireless Broadband Service authorized under Subpart H of parts 22, 24, 25, 26, 27, 80, and 90 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use, as specified in Sec. Sec. 2.1091 and 2.1093 of this chapter. Unlicensed PCS, unlicensed NII and millimeter wave devices are also subject to routine environmental evaluation for RF exposure prior to equipment authorization or use, as specified in Sec. Sec. 15.253(f), 15.255(g), 15.319(i), and 15.407(f) of this chapter. Portable transmitting equipment for use in the Wireless Medical Telemetry Service (WMTS) is subject to routine environment evaluation as specified in Sec. Sec. 2.1093 and 5.1125 of this chapter. Equipment authorized for use in the Medical Implant Communications Service (MICS) as a medical implant transmitter (as defined in Appendix 1 to Subpart E of part 95 of this chapter) is subject to routine environmental evaluation for RF exposure prior to equipment authorization, as specified in Sec.2.1093 of this chapter by finite difference time domain computational modeling or laboratory measurement techniques. Where a showing is based on computational modeling, the Commission retains the discretion to request that specific absorption rate measurement data be submitted. All other mobile, portable, and unlicensed transmitting devices are categorically excluded from routine environmental evaluation for RF exposure under Sec. Sec. 2.1091, 2.1093 of this chapter except as specified in paragraphs (c) and (d) of this section.

* * * * *

PART 2 – FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

1. The authority citation for Part 2 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

2. Section 2.106, the Table of Frequency Allocations, is amended as follows:

a. Revise page 54.

b. In the list of United States footnotes, revise footnote US245.

c. In the list of non-Federal Government footnotes, remove footnote NG170 and add footnote NG185.

§ 2.106 Table of Frequency Allocations.

The revisions and additions read as follows:

* * * * *

2900-3100 RADIONAVIGATION 5.426 Radiolocation 5.425 5.427			2900-3100 MARITIME RADIONAVIGATION Radiolocation G56 5.427 US44 US316	2900-3100 MARITIME RADIONAVIGATION Radiolocation US44 5.427 US316	Maritime (80) Private Land Mobile (90)
3100-3300 RADIOLOCATION Earth exploration-satellite (active) Space research (active) 5.149 5.428			3100-3300 RADIOLOCATION G59 Earth exploration-satellite (active) Space research (active) US342	3100-3300 Radiolocation Earth exploration-satellite (active) Space research (active) US342	Private Land Mobile (90)
3300-3400 RADIOLOCATION 5.149 5.429 5.430	3300-3400 RADIOLOCATION Amateur Fixed Mobile 5.149 5.430	3300-3400 RADIOLOCATION Amateur 5.149 5.429	3300-3500 RADIOLOCATION US108 G31	3300-3500 Amateur Radiolocation US108	Private Land Mobile (90) Amateur (97)
3400-3600 FIXED FIXED-SATELLITE (space-to-Earth) Mobile Radiolocation 5.431	3400-3500 FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile Radiolocation 5.433 5.282 5.432		US342	US342 5.282	
3600-4200 FIXED FIXED-SATELLITE (space-to-Earth) Mobile	3500-3700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation 5.433 5.435		3500-3650 RADIOLOCATION G59 AERONAUTICAL RADIONAVIGATION (ground-based) G110 US245	3500-3600 Radiolocation 3600-3650 FIXED-SATELLITE (space-to-Earth) US245 Radiolocation	Private Land Mobile (90)
			3650-3700 US348 US349	3650-3700 FIXED FIXED-SATELLITE (space-to-Earth) NG169 NG185 MOBILE except aeronautical mobile US348 US349	Satellite Communications (25) Private Land Mobile (90)
	See next page for 3700-4200 MHz		See next page for 3700-4200 MHz	See next page for 3700-4200 MHz	See next page for 3700-4200 MHz

* * * * *

UNITED STATES (US) FOOTNOTES

* * * * *

US245 In the bands 3600-3650 MHz (space-to-Earth), 4500-4800 MHz (space-to-Earth), and 5850-5925 MHz (Earth-to-space), the use of the non-Federal fixed-satellite service is limited to international inter-continental systems and is subject to case-by-case electromagnetic compatibility analysis. The FCC's policy for these bands is codified at 47 C.F.R. § 2.108.

* * * * *

NON-FEDERAL (NG) FOOTNOTES

* * * * *

NG185 In the band 3650-3700 MHz, the use of the non-Federal fixed-satellite service (space-to-Earth) is limited to international inter-continental systems.

* * * * *

3. Section 2.1091 is amended by revising paragraph (c) to read as follows:

§ 2.1091 Radiofrequency radiation exposure evaluation: mobile devices.

* * * * *

(c) Mobile devices that operate in the Cellular Radiotelephone Service, the Personal Communications Services, the Satellite Communications Services, the General Wireless Communications Service, the Wireless Communications Service, the Maritime Services and the Specialized Mobile Radio Service, and the 3650MHz Wireless Broadband Service authorized under subpart H of part 22 of this chapter, parts 24, 25, 26 and 27 of this chapter, part 80 of this chapter (ship earth stations devices only) and part 90 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more, or if they operate at frequencies above 1.5 GHz and their ERP is 3 watts or more. Unlicensed personal communications service devices, unlicensed millimeter wave devices and unlicensed NII devices authorized under §§ 15.253, 15.255, and 15.257, and subparts D and E of part 15 of this chapter are also subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if their ERP is 3 watts or more or if they meet the definition of a portable device as specified in § 2.1093(b) requiring evaluation under the provisions of that section. All other mobile and unlicensed transmitting devices are categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in §§ 1.1307(c) and 1.1307(d) of this chapter. Applications for equipment authorization of mobile and unlicensed transmitting devices subject to routine environmental evaluation must contain a statement confirming compliance with the limits specified in paragraph (d) of this section as part of their application. Technical information showing the basis for this statement must be submitted to the Commission upon request.

* * * * *

4. Section 2.1093 is amended by revising paragraph (c) to read as follows:

§ 2.1093 Radiofrequency radiation exposure evaluation: portable devices.

* * * * *

(c) Portable devices that operate in the Cellular Radiotelephone Service, the Personal Communications Service (PCS), the Satellite Communications Services, the General Wireless Communications Service, the Wireless Communications Service, the Maritime Services, the Specialized Mobile Radio Service, the 3650 MHz Wireless Broadband Service, the 4.9 GHz Band Service, the Wireless Medical Telemetry Service (WMTS) and the Medical Implant Communications Service (MICS), authorized under subpart H of part 22 of this chapter, parts 24, 25, 26,27, 80 and 90 of this chapter, subparts H and I of part 95 of this chapter, and unlicensed personal communication service, unlicensed NII devices and millimeter wave devices authorized under subparts D and E, §§ 15.253, 15.255 and 15.257 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use. All other portable transmitting devices are categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in §§ 1.1307(c) and 1.1307(d) of this chapter. Applications for equipment authorization of portable transmitting devices subject to routine environmental evaluation must contain a statement confirming compliance with the limits specified in paragraph (d) of this section as part of their application. Technical information showing the basis for this statement must be submitted to the Commission upon request.

* * * * *

PART 25 – SATELLITE COMMUNICATIONS

5. The authority citation for Part 25 continues to read as follows:

AUTHORITY: 47 U.S.C. 701-744. Interprets or applies Sections 4, 301, 302, 307, 309 and 332 of the Communications Act, as amended, 47 U.S.C. Sections 154, 301, 302, 307, 309 and 332, unless otherwise noted.

6. Section 25.202 is amended by adding an entry for 3.65-3.7 GHz and a new footnote 17 to the table in paragraph (a)(1) to read as follows:

§ 25.202 Frequencies, frequency tolerance and emission limitations.

(a)(1) * * *

Space-to-Earth (GHz)	Earth-to-space (GHz)
3.65-3.7 [17]	* * * * *
* * * * *	

* * * * *

[17] FSS earth stations in this band must operate on a secondary basis to terrestrial radiocommunication services, except that the band is shared co-equally between certain grandfathered earth stations and the terrestrial radiocommunication services.

* * * * *

7. Section 25.208 is amended by revising the heading and by revising the first sentence of paragraph (a) to read as follows:

§ 25.208 Power flux-density limits.

* * * * *

(a) In the band 3650-4200 MHz, the power flux density at the Earth's surface produced by emissions from a space station for all conditions and for all methods of modulation shall not exceed the following values:

* * * * *

8. Part 25 is amended by adding a new section 25.256 to read as follows:

§ 25.256 Special Requirements for operations in the 3.65-3.7 GHz band.

Upon request from a terrestrial licensee authorized under Subpart Z, Part 90 that seeks to place base and fixed stations in operation within 150 km of a primary earth station, licensees of earth stations operating on a primary basis in the fixed satellite service in the 3.65-3.7 GHz band must negotiate in good faith with that terrestrial licensee to arrive at mutually agreeable operating parameters to prevent unacceptable interference.

PART 90 – PRIVATE LAND MOBILE RADIO SERVICES

1. The authority citation for Part 90 continues to read as follows:

AUTHORITY: Sections 4(i), 11, 303(g), 303(r), and 332(c)(7) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 161, 303(g), 303(r), 332(c)(7).

2. The table of contents for Part 90 is amended by adding subpart Z as follows:

* * * * *

Subpart Z – 3650 MHz Wireless Broadband Services

90.1301	Scope.
90.1303	Eligibility.
90.1305	Permissible operations.
90.1307	Licensing.
90.1309	Regulatory status.
90.1311	License term.
90.1312	Assignment and Transfer.
90.1319	Policies governing the use of the 3650-3700 MHz band.
90.1321	Power limits.
90.1323	Emission limits.
90.1331	Restrictions on the operation of base and fixed stations.
90.1333	Restrictions on the operation of mobile and portable stations.
90.1335	RF safety.
90.1337	Canadian and Mexican coordination.

3. Section 90.7 is amended by adding a new definition, in the alphabetically-appropriate location, as follows:

§ 90.7 Definitions.

* * * * *

Contention-based protocol. A protocol that allows multiple users to share the same spectrum by defining the events that must occur when two or more transmitters attempt to simultaneously access the same channel and establishing rules by which a transmitter provides reasonable opportunities for other transmitters to operate. Such a protocol may consist of procedures for initiating new transmissions, procedures for determining the state of the channel (available or unavailable), and procedures for managing retransmissions in the event of a busy channel.

* * * * *

4. Section 90.203 is amended by adding a new paragraph (o), to read as follows:

§ 90.203 Certification required.

* * * * *

(o) Equipment certification for transmitters in the 3650-3700 MHz band.

(1) Applications for all transmitters must describe the methodology used to meet the requirement that each transmitter employ a contention based protocol (see §§ 90.7, 90.1305 and 90.1321 of this part);
(2) Applications for mobile transmitters must identify the base stations with which they are designed to communicate and describe how the requirement to positively receive and decode an enabling signal is incorporated (see § 90.1333 of this part); and
(3) Applications for systems using advanced antenna technology must provide the algorithm used to reduce the equivalent isotropically radiated power (EIRP) to the maximum allowed in the event of overlapping beams (see § 90.1321 of this part).
(4) Applications for fixed transmitters must include a description of the installation instructions and guidelines for RF safety exposure requirements that will be included with the transmitter. (See § 90.1335).

5. A new subpart Z is added to read as follows;

Subpart Z - Wireless Broadband Services in the 3650-3700 MHz Band

§ 90.1301 Scope.

This subpart sets out the regulations governing wireless operations in the 3650-3700 MHz band. It includes licensing requirements, and specific operational and technical standards for wireless operations in this band. The rules in this subpart are to be read in conjunction with the applicable requirements contained elsewhere in the Commission's rules; however, in case of conflict, the provisions of this subpart shall govern with respect to licensing and operation in this band.

§ 90.1303 Eligibility.

Any entity, other than those precluded by section 310 of the Communications Act of 1934, as amended, 47 U.S.C. 310, is eligible to hold a license under this part.

§ 90.1305 Permissible operations.

Use of the 3650-3700 MHz band must be consistent with the allocations for this band as set forth in Part 2 of the Commission's Rules. All stations operating in this band must employ a contention-based protocol (as defined in Section 90.7).

§ 90.1307 Licensing.

The 3650-3700 MHz band is licensed on the basis of non-exclusive nationwide licenses. Non-exclusive nationwide licenses will serve as a prerequisite for registering individual fixed and base stations. A licensee cannot operate a fixed or base station before registering it under its license and licensees must delete registrations for unused fixed and base stations.

§ 90.1309 Regulatory status.

Licensees are permitted to provide services on a non-common carrier and/or on a common carrier basis. A licensee may render any kind of communications service consistent with the regulatory status in its license and with the Commission's rules applicable to that service.

§ 90.1311 License Term.

Because the licensee will obtain a single license for all of its facilities, the license renewal period will be ten years from the registration of the first fixed or base station. Adding fixed and base stations will not change the overall renewal period of the license.

§ 90.1312 Assignment and Transfer.

Licensees may assign or transfer their non-exclusive nationwide licenses, and any fixed or base stations registered under those licenses will remain associated with those licenses.

§ 90.1319 Policies governing the use of the 3650-3700 MHz band.

(a) Channels in this band are available on a shared basis only and will not be assigned for the exclusive use of any licensee

(b) Any base, fixed, or mobile station operating in the band must employ a contention-based protocol.

(c) All applicants and licensees shall cooperate in the selection and use of frequencies in the 3650-3700 MHz band in order to minimize the potential for interference and make the most effective use of the authorized facilities. A database identifying the locations of registered stations will be available at <http://wireless.fcc.gov/uls>. Licensees should examine this database before seeking station authorization, and make every effort to ensure that their fixed and base stations operate at a location, and with technical parameters, that will minimize the potential to cause and receive interference. Licensees of stations suffering or causing harmful interference are expected to cooperate and resolve this problem by mutually satisfactory arrangements.

§ 90.1321 Power and antenna limits.

(a) Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one-megahertz slice of spectrum.

(b) In addition to the provisions in paragraph (a) of this section, transmitters operating in the 3650-3700 MHz band that emit multiple directional beams, simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers provided the emissions comply with the following:

(1) Different information must be transmitted to each receiver.

(2) If the transmitter employs an antenna system that emits multiple directional beams but does not emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device, i.e., the sum of the power supplied to all antennas, antenna elements, staves, etc. and summed across all carriers or frequency channels, shall not exceed the limit specified in paragraph (a) of this section, as applicable. The directional antenna gain shall be computed as follows:

(i) The directional gain, in dBi, shall be calculated as the sum of 10 log (number of array elements or staves) plus the directional gain, in dBi, of the individual element or stave having the highest gain.

(ii) A lower value for the directional gain than that calculated in paragraph (b)(2)(i) of this section will be accepted if sufficient evidence is presented, e.g., due to shading of the array or coherence loss in the beam-forming.

(3) If a transmitter employs an antenna that operates simultaneously on multiple directional beams using the same or different frequency channels and if transmitted beams overlap, the power shall be reduced to ensure that the aggregate power from the overlapping beams does not exceed the limit specified in paragraph (b)(2) of this section. In addition, the aggregate power transmitted simultaneously on all beams shall not exceed the limit specified in paragraph (b)(2) of this section by more than 8 dB.

(4) Transmitters that emit a single directional beam shall operate under the provisions of paragraph (b)(2) of this section.

(c) Mobile and portable stations are limited to 1 watt/25 MHz EIRP. In any event, the peak EIRP density shall not exceed 40 milliwatts in any one-megahertz slice of spectrum.

§ 90.1323 Emission limits.

(a) The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

§ 90.1331 Restrictions on the operation of base and fixed stations.

(a) (1) Except as provided in paragraph (a)(2) of this section, base and fixed stations may not be located within 150 km of any grandfathered satellite earth station operating in the 3650-3700 MHz band. The coordinates of these stations are available at [website].

(2) Base and fixed stations may be located within 150 km of a grandfathered satellite earth station provided that the licensee of the satellite earth station and the 3650-3700 MHz licensee mutually agree on such operation.

(3) Any negotiations to enable base or fixed station operations closer than 150 km to grandfathered satellite earth stations must be conducted in good faith by all parties.

(b) (1) Except as specified in paragraph (b)(2) of this section, base and fixed stations may not be located within 80 km of the following Federal Government radiolocation facilities:

St. Inigoes, MD - 38° 10' N., 76°, 23' W.
Pascagoula, MS - 30° 22' N., 88°, 29' W.
Pensacola, FL 30° 21' 28" N., 87°, 16' 26" W.

Note: Licensees installing equipment in the 3650-3700 MHz band should determine if there are any nearby Federal Government radar systems that could affect their operations. Information regarding the location and operational characteristics of the radar systems operating adjacent to this band are provided in NTIA TR-99-361.

(2) Requests for base or fixed station locations closer than 80 km to the Federal Government radiolocation facilities listed in paragraph (b)(1) of this section will only be approved upon successful coordination by the Commission with NTIA through the Frequency Assignment Subcommittee of the Interdepartmental Radio Advisory Committee.

§ 90.1333 Restrictions on the operation of mobile and portable stations.

(a) Mobile and portable stations may operate only if they can positively receive and decode an enabling signal transmitted by a base station.

(b) Any mobile/portable stations may communicate with any other mobile/portable stations so long as each mobile/portable can positively receive and decode an enabling signal transmitted by a base station.

(c) Airborne operations by mobile/portable stations is prohibited.

§90.1335 RF safety.

Licensees in the 3650-3700 MHz band are subject to the exposure requirements found in Sections 1.1307(b), 2.1091 and 2.1093 of our Rules.

§90.1337 Operation near Canadian and Mexican borders.

(a) Fixed devices generally must be located at least 8 kilometers from the U.S./Canada or U.S./Mexico border if the antenna of that device looks within the 160° sector away from the border. Fixed devices must be located at least 56 kilometers from each border if the antenna looks within the 200° sector towards the border.

(b) Fixed devices may be located nearer to the U.S./Canada or U.S./Mexico border than specified in paragraph (a) of this section only if the Commission is able to coordinate such use with Canada or Mexico, as appropriate.

(c) Licensees must comply with the requirements of current and future agreements with Canada and Mexico regarding operation in U.S./Canada and U.S./Mexico border areas.

APPENDIX B: Final Regulatory Flexibility Analysis

As required by the Regulatory Flexibility Act of 1980, as amended (RFA),[163] an Initial Regulatory Flexibility Analysis ((IFRA) was incorporated in the Notice of Proposed Rule Making (NPRM), "*Unlicensed Operation in the Band 3650-3700 MHz.*" [164] The Commission sought written public comments on the proposals in the NPRM, including comment on the IRFA. This Final Regulatory Flexibility Analysis conforms to the RFA.[165]

A. Need for, and Objectives of, the Report and Order

The Report and Order ("Order") adopts rules that provide for nationwide, non-exclusive, licensing of terrestrial operations, utilizing contention-based technologies, in the 3650-3700 MHz band (3650 MHz band).

The Order would take the following actions:

- Maintain the existing Fixed Satellite Service (FSS) and Fixed Service (FS) allocations and modify the Mobile Service (MS) allocation to delete the restriction against mobile-to-mobile operations in the 3650 MHz band. The Order would also maintain the international / intercontinental operation requirements for FSS earth stations.

- Adopt a streamlined licensing mechanism that will serve as a safeguard to protect incumbent satellite earth stations and Federal Government radiolocation stations from harmful interference

- Establish minimal regulatory entry requirements that should encourage multiple entrants and stimulate the rapid expansion of broadband services - especially in rural America

- Establish licensing, service and technical rules that allow fixed, and base-station-enabled mobile terrestrial operations

B. Summary of Significant Issues Raised by Public Comments in Response to the IRFA

None.

C. Description and Estimate of the Number of Small Entities to Which Rules Will Apply

The RFA directs agencies to provide a description of, and, where feasible, an estimate of, the number of small entities that may be affected by the rules adopted herein.[166] The RFA generally defines the term "small entity" as having the same meaning as the terms, "small business," "small organizations," and "small governmental jurisdiction."[167] In addition, the term "small business" has the same meaning as the

[163] *See* 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. §§ 601-612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Public Law 104-121, Title II, 110 Stat. 857 (1996).

[164] *See Notice of Proposed Rule Making* in ET Docket No. 04-151, 19 FCC Rcd 7545 (7580) (2004).

[165] *See* 5 U.S.C. § 604.

[166] *See* 5 U.S.C. § 604(a)(3).

[167] 5 U.S.C. § 601(6).

term "small business concern" under the Small Business Act.[168] A "small business concern" is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).[169] Nationwide, there are a total of 22.4 million small businesses, according to SBA data.[170]

A "small organization" is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field."[171] Nationwide, there are approximately 1.6 million small organizations.[172] The term "small governmental jurisdiction" is defined as "governments of cities, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand."[173] As of 1997, there were approximately 87,453 governmental jurisdictions in the United States.[174] This number includes 39,044 county governments, municipalities, and townships, of which 37,546 (approximately 96.2%) have populations of fewer than 50,000, and of which 1,498 have populations of 50,000 or more. Thus, we estimate the number of small governmental jurisdictions overall to be 84,098 or fewer.

The Commission has not developed a definition of small entities applicable to manufacturers of communications devices that are licensed on a nationwide, non-exclusive basis. Therefore, we will utilize the SBA definition applicable to Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing. Examples of products in this category include "transmitting and receiving antennas, cable television equipment, GPS equipment, pagers, cellular phones, mobile communications equipment, and radio and television studio and broadcasting equipment"[175] and may include other devices that transmit and receive IP-enabled services, such as personal digital assistants (PDAs). Under the SBA size standard, firms are considered small if they have 750 or fewer employees.[176] According to Census Bureau data for 1997, there were 1,215 establishments[177] in this category that operated for the entire

[168] 5 U.S.C. § 601(3) (incorporating by reference the definition of "small-business concern" in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register."

[169] 15 U.S.C. § 632.

[170] *See* SBA, Programs and Services, SBA Pamphlet No. CO-0028, at page 40 (July 2002).

[171] *See* 5 U.S.C. § 601(4).

[172] Independent Sector, The New Nonprofit Almanac & Desk Reference (2002).

[173] 5 U.S.C. § 601(5).

[174] U.S. Census Bureau, Statistical Abstract of the United States: 2000, Section 9, pages 299-300, Tables 490 and 492.

[175] Office of Management and Budget, North American Industry Classification System, pages 308-09 (1997) (NAICS code 334220).

[176] 13 C.F.R. § 121.201, NAICS code 334220.

[177] The number of "establishments" is a less helpful indicator of small business prevalence in this context than would be the number of "firms" or "companies," because the latter take into account the concept of common ownership or control. Any single physical location for an entity is an establishment, even though that location may be owned by a different establishment. Thus, the numbers given may reflect inflated numbers of businesses in this category, including the numbers of small businesses. In this category, the Census breaks-out data for firms or companies only to give the total number of such entities for 1997, which was 1,089.